OXC - 4688
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18 March 1963

MEMORANDUM FOR : Chief, Development Division, OSA-DD/R

SUBJECT : Use of Production JT11D-20 Engine #644219 For Calibration

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1. Subject was first mentioned informally to Headquarters by [redacted] of Pratt & Whitney on 8 March 1963. A formal written proposal is expected 19 March 1963.

2. There is little doubt that a more representative performance calibration could be made using subject production engine incorporating the Table III performance improvement package over a calibration made using a development engine of the same configuration. The basic differences are that the development engine hardware was built to more loosely defined experimental shop standards rather than production flight standards and much of the development hardware has been recycled from engine to engine for maximum utilization and therefore is not representative of a new set as is the case with a production engine. To program a completely new set of experimental hardware for this calibration would reduce development program flexibility. Some specific examples of experimental hardware deficiency, although maybe small individually but larger in total, are:

a. Wall discontinuity and warpage of various gas passages such as diffuser cases which have been reoperated, run, reoperated again, and rerun to evaluate the effect of installing and removing trips and baffles for burner and turbine inlet profile improvement.

b. Bowing and otherwise inaccurate geometry of compressor stators resulting from reoperation and running to evaluate changing from the brazed to the forged configuration.

c. Wall discontinuity and warpage of afterburner liners resulting from reoperations and running for durability and performance improvement.

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d. Air leakage resulting from warpage of all engine case flanges caused by various durability and performance programs.

e. Various gas passage contours have been compromised by modification to incorporate instrumentation.

The effect of the above items and probably others which are less recognizable, is reported to be reflected in a 3% sea level static performance improvement in a production engine over a development engine. A similar or dissimilar effect has not been demonstrated at altitude to date.

3. The worthiness of a firm representative calibration such as afforded by a production engine cannot be disputed for any program and particularly for this program in view of the importance of cruise performance and the probable inability and certainly the difficulty of establishing engine performance at a later date during flight test. Probably more important to the contractor than to Headquarters is such a calibration in view of pending contractual actions for the follow-on USAF program. The degree of value to Headquarters for this calibration however must be considered in terms of added cost and flight operation requirements for the engine.

4. In the past, at present, and in the foreseeable future, main fuel control deliveries will pace engine deliveries. Removal of subject engine from the flight program for three months therefore will probably not be felt if the production control assigned were reassigned to the subsequent engine #220 now waiting final test because of the lack of same. Further, it now appears that if other engine deliveries keep pace with existing schedules, the flight program should be adequately supported engine-wise through 1963 barring any future major problems and future control delivery slippage.

5. The contractor should be made to agree that the cost to Headquarters of running subject calibration including repair and/or overhaul of the engine as required will not be more than that resulting from a similar calibration using a development engine.

6. It would appear reasonable therefore at this point in time that the use of engine #643219 for subject calibration would technically benefit the GICART program without disrupting the flight program provided the engine can be returned to flight status by 1 July 1963.

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7. Recommend that engine A44219 less main fuel control be made available for subject calibration with the condition that it be returned to flight status on or before 1 July 1963.

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[redacted]
Development Division
OSA-DD/R

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